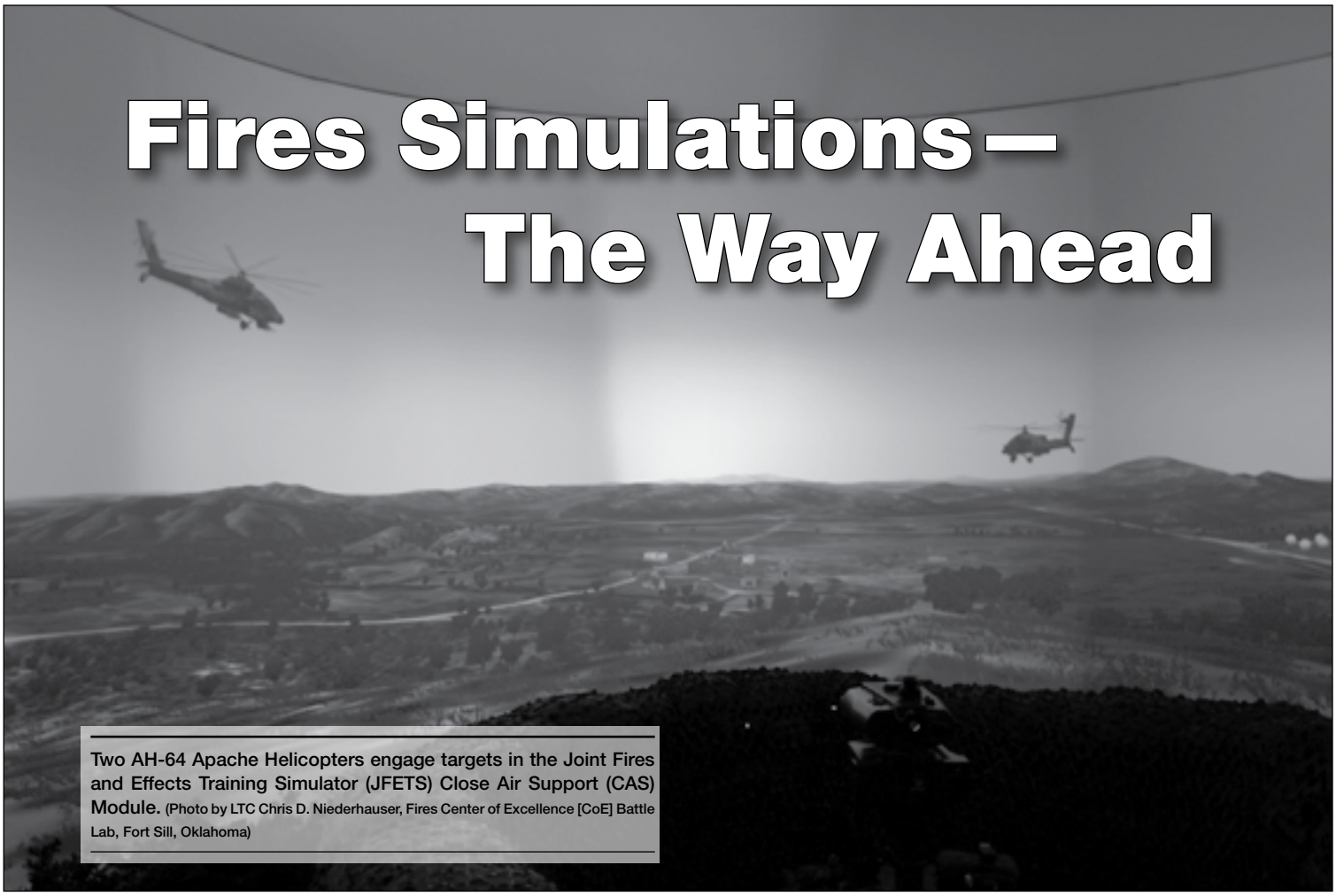
Fires Simulations—The Way Ahead



Two AH-64 Apache Helicopters engage targets in the Joint Fires and Effects Training Simulator (JFETS) Close Air Support (CAS) Module. (Photo by LTC Chris D. Niederhauser, Fires Center of Excellence [CoE] Battle Lab, Fort Sill, Oklahoma)

By LTC Christopher D. Niederhauser, FA57

Since the 1980s, Fort Sill, Oklahoma, has been a leader in simulations development to support Field Artillery (FA) training. The Fires Battle Lab (previously named the Depth and Simultaneous Attack Battle Lab) was the first to identify a need to develop an interface that translated simulations' messages into tactical messages to stimulate Advanced FA Tactical Data System (AFATDS) for training. This led to the development of the Enhanced Protocol Interface Unit that enabled Artillery staffs to train in a "free play" simulated environment on a large scale. This first step into "doing the impossible" has provided immeasurable benefits to the Army and Department of Defense.

Today, the Fires Center of Excellence (CoE), again, is leading simulations development on many fronts and is on the cusp of providing enhanced training capabilities. This article examines some exciting capabilities that the Fires CoE either has available or is developing to give commanders a capability to train their Soldiers and staffs.

Simulations Integrated Product Team. In September 2008, Fires CoE chartered a Simulations Integrated Product Team. This team has two initial initiatives. First is the development of a strategic plan that includes all Fort Sill and subsequent Fires CoE stakeholders. Second is an organization review and development of recommendations for the optimum management and planning of simulations. To date, the team completed the organizational recommendations and an initial gap analysis. From this analysis, four key gaps are highlighted.

First, FA organizations lack the ability to train leaders and staffs, fire support teams, command and control, weapons systems and radar and meteorological systems simultaneously in a mutually supporting, fully interactive, realistic, immersive training environment on the full spectrum of fire support operations and tasks. Second, the Fires CoE does not have the capability to conduct distributed individual/collective training within classified and unclassified environments for initial entry, pre-deployment and sustainment training. Third, leaders do not have the ability to exercise cognitive decision-making tasks in a semi-immersive environment. Finally, Soldiers do not have the capability to apply varying factors as they pertain to Artillery gunnery and see the ballistic effects in real-time outside of a live environment.

Closing the Gaps. Given the above gaps, the Fires CoE is working diligently to use off-the-shelf capabilities to close the gaps rapidly and investing in technologies where capabilities do not exist already. The Fires Battle Lab staff is working on three initiatives currently.

Integrated Fires Simulated System. Integrating the Fire Support Combined Arms Tactical Trainer (FSCATT) into a networked-training architecture was the first step to merge current technologies into a training environment. Developing a message translator to bridge FSCATT and AFATDS allows an observer in the Call For Fire Trainer (CFFT) or Joint Fires and Effects Trainer System (JFETS) to link digitally to the FSCATT.

This digital capability from the observer to an AFATDS expands the com-

A platoon is created in the Army's newly fielded Virtual Battlespace 2 game, a virtual training game similar to the Virtual Platoon game being developed. (Photo by LTC Chris D. Niederhauser, Fires CoE Battle Lab)

mander's ability to develop an exercise that simultaneously trains observers, crews and staffs in a live, virtual and constructive environment. As the FSCATT is updated with current software, we will have an even greater capability to use that system in an integrated training environment. Although this is a great start, we must continue to bring other cannon and rocket systems, as well as radars, into the integrated-training environment.

Distributed Capability. Developing a distributed capability will enable Fires Soldiers to train as part of the BCT. Fires Battle Lab participates in an exercise that networks the JFETS and CFFT to an Aviation Combined Arms Tactical Trainer (AVCATT) at Fort Rucker, Alabama, and the Close Combat Tactical Trainer (CCTT) at Fort Benning, Georgia. In addition to demonstrating a capability to link these simulations in a common scenario operating in real-time, we will try to have a forward observer in JFETS lase targets for Hellfire engagements from AH-64D Longbow Apache and OH-58KW Kiowa Warrior helicopters.

Deployable and Exportable Training Systems. Making our training systems deployable and exportable will put training capabilities where they are needed, when they are needed. To support Reset training, the Fires CoE, in partnership with Creative Technologies Inc., developed a mobile training platform to deliver training to Soldiers where they need it.

Gaming Trainers. In coordination with the Training and Doctrine Command (TRADOC) Capabilities Manager-Gaming (TCM-G), the Fires CoE provided requirements for the development of Virtual Platoon and Ballistic Concepts Trainer games. These games will provide "virtual training" to leaders on a variety of scenarios they will face during their careers.

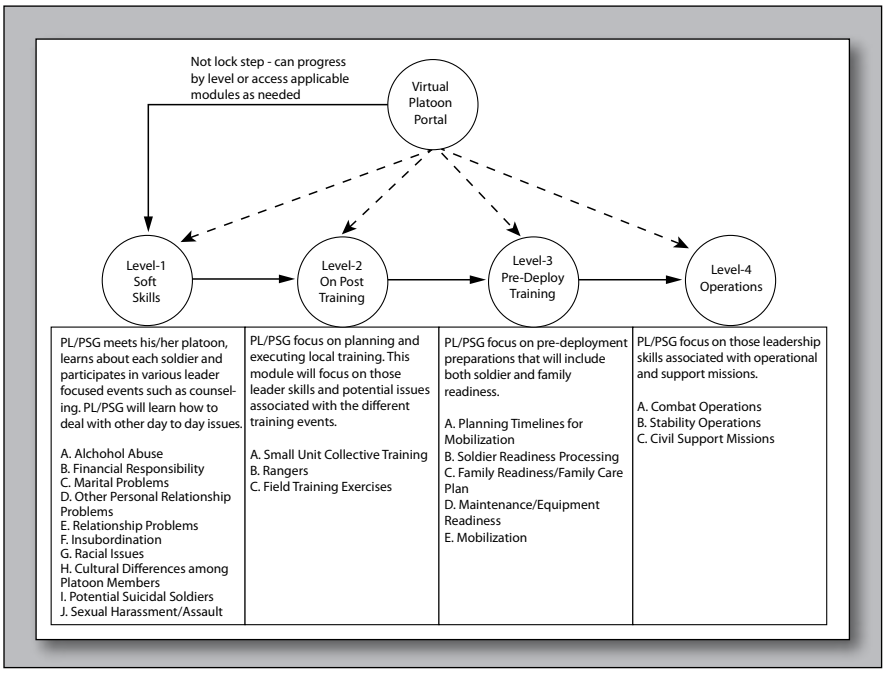
The Virtual Platoon Game. The Virtual Platoon game's concept is a lieutenant, upon his arrival to Basic Officer Leaders Course (BOLC), literally is assigned a platoon that is replicated within the game. This platoon would present all of the challenges a new lieutenant might encounter in his first assignment and beyond. These challenges include discipline problems, training challenges, deployment preparation and even planning and rehearsal for training and combat operations. The figure highlights some of the situations faced in the game.

The Virtual Platoon game would be scalable and progressive in design. A junior officer will interact with virtual characters in the game, supported by artificial intelligence technology. These virtual characters will represent the members of his virtual platoon and key higher headquarters personnel that serve as automated "assistant instructors" as the officer progresses through various scenarios.

The scenarios vary in difficulty and purpose; beginning with interacting with his platoon leadership, developing training plans and managing time. Gradually, the officer progresses to other scenarios where he plans live-training events and conducts rehearsals for these events within the game on geographically-specific terrain. And finally, the officer could use the game to plan and rehearse tactical operations.

Key to this game's concept is linkage within the game to the "assistant instructor" that would provide feedback, guidance and instruction to the officer, relating to certain task performance and decisions the officer made during various scenarios. The game will be a deployable software product that goes with the Soldier and will be linked to the Fires Knowledge Network online where content managers would provide automatic updates to training scenarios and vignettes. Additionally, officers could upload training plans and scenarios that they have developed during their use of the gaming tool.

Ballistics Concepts Trainer Game. One specific initiative currently under analysis and development is the Army Artillery Ballistics Concepts Trainer that addresses the need for junior officers to develop and master ballistics concepts and visualize the effects of inputs on munitions' accuracies. The Fires CoE Directorate of Training and Doctrine (DOTD) is working with TCM-G and private industry to develop a gaming technology that will address this



The Virtual Platoon simulation game teaches a platoon leader (PL) or platoon sergeant (PSG) what leading a platoon entails.

This example fires cell enables units to use training center or unit battle command systems with simulation. (Photo by LTC Chris D. Niederhauser, Fires CoE Battle Lab)

requirement. When fully developed, this technology will be available for distribution to FA users at institutional and operational units at home station and while deployed.

Engagement Control Station Simulation (ECS²). The ECS² is an immersive training technology solution under development between the Air Defense Artillery School Directorate of Training, Doctrine and Leader Development and the University of Southern California's Institute for Creative Technology. The ECS² will use a combination of immersive simulation and digital classroom technology to develop leaders with the cognitive skills required for Patriot system operations. The system is designed to allow leaders to develop and execute courses of action and understand the consequences of those actions based on their awareness of what is occurring in the operational environment.

Replication of Fires (RoF). Looking further into the future, the Fires CoE is engaged with Program Executive Office for Simulation, Training and Instrumentation (PEO-STRI) and the National Simulation Center to ensure the replication of effects. Historically, US Army combat training centers (CTCs) understated battlefield effectiveness of Fires resulting in under usage of Fires. So, Fires Battle Lab and Fires CoE developed Replication of Fires—the mathematical methodologies needed to assess the effects of Fires (both damage and suppression) realistically for CTC training environments.

Successfully integrating RoF at the National Training Center (NTC), Fort Irwin, California, essentially "corrected" the commanders' perceptions and usage of Fires. Fires Battle Lab and Fires CoE are following their NTC success by working with modeling and simulation developers at PEO-STRI to implement the RoF methodologies in the modeling and simulation tools/technologies involved in future Fires assessments for all CTCs and home station training. These tools include Objective Instrumentation Systems, Home-station Instrumentation Training System and One Target Engagement Sub System.

Fires Battle Lab and Fires CoE must continue to monitor and influence related modeling and simulation developments to ensure realistic Fires and effects for all combat training. Many modeling and simulation initiatives depend on seamless interoperability of Soldiers, machines and simulations. Fires Battle Lab is called upon often to construct live/virtual/simulated environments that allow real-world Soldiers employing real-world tactical hardware/software to interface with simulation federations.

These modeling and simulation interoperabilities are necessary to support field training, future force integration, future concept experiments, special lab experiments, etc. Army tactical systems are extremely complex and dynamic; software versions can change often and drastically. Fires Battle Lab and Fires CoE must stay vigilant to ensure that fundamental modeling and simulation interoperabilities are identified, developed, tested and established well in advance of the tactical systems encountered. Otherwise, our live/virtual/constructive simulation environments cannot be established in the timely manner required. FireSim XXI and Extended Air Defense Simulation (EADSIM) are applied widely due to the tactical interoperabilities they now enjoy. However, we must continue to invest time, energy and funds to maintain these basic and critical modeling and simulation infrastructures proactively.

The Fires CoE continues to be a leader in the development of simulations for training, analysis and experimentation. The Fires CoE will continue to push the envelope in simulations development with the technological breakthroughs we achieve through the development of immersive simulations, such as JFETS or a game that enhances a Soldier's understanding of ballistic theory.

Our ideas can keep pace with and sometimes outrun the technology, but we need your help to keep pace with the ever-changing operational environment and tactics, techniques and procedures. Your feedback is the most important aspect to our simulations development, so we can fill the gaps to help you achieve your objectives. In the end, the Fires CoE wants to provide an integrated live-virtual-constructive training solution for our Fires team.

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